```
Set     Items   Description
S1      13661   LAPLACE OR SIGNUM OR (FAST OR DIGITAL)()FOURIER()TRANSFORM?
                OR FFT OR DFT OR FOURIER()TRANSFORM?
S2      20006   (DIGITAL OR ELECTRONIC)(2W)(WATERMARK? OR WATER()MARK?) OR
                WATERMARK? OR WATER()MARK? OR TRANSLUCENT()DESIGN?
S3     8767594  FILTER? OR LOOKUP OR LOOK()UP OR SEARCH? OR SEEK? OR QUER?
                OR MATCH? OR QUEST? OR PURSU? OR FIND? OR RETRIEV? OR EXTRACT?
                OR SEPARATE? OR DIFFERENTIAT? OR SCREEN? OR PREFILTER? OR PR-
                E()FILTER?
S4     4866795  DETECT? OR DETERMIN? OR DECID? OR RESOLV? OR ASCERTAIN? OR
                RECOGNI?
S5      36      S1(S) S2
S6      11      S5 (S) S3
S7      0       S6 (S) S4
S8      36      S5 OR S6
S9      0       S8 NOT PY>1995
File  15:ABI/Inform(R) 1971-2004/Aug 12
         (c) 2004 ProQuest Info&Learning
File 810:Business Wire 1986-1999/Feb 28
         (c) 1999 Business Wire
File 647:CMP  Computer Fulltext 1988-2004/Aug W1
         (c) 2004 CMP Media, LLC
File 275:Gale Group Computer DB(TM) 1983-2004/Aug 12
         (c) 2004 The Gale Group
File 674:Computer News Fulltext 1989-2004/Jul W4
         (c) 2004 IDG Communications
File 696:DIALOG Telecom. Newsletters 1995-2004/Aug 11
         (c) 2004 The Dialog Corp.
File 621:Gale Group New Prod.Annou.(R) 1985-2004/Aug 12
         (c) 2004 The Gale Group
File 636:Gale Group Newsletter DB(TM) 1987-2004/Aug 12
         (c) 2004 The Gale Group
File 813:PR Newswire 1987-1999/Apr 30
         (c) 1999 PR Newswire Association Inc
File 613:PR Newswire 1999-2004/Aug 12
         (c) 2004 PR Newswire Association Inc
File  16:Gale Group PROMT(R) 1990-2004/Aug 12
         (c) 2004 The Gale Group
File 160:Gale Group PROMT(R) 1972-1989
         (c) 1999 The Gale Group
File 553:Wilson Bus. Abs. FullText 1982-2004/Jul
         (c) 2004 The HW Wilson Co
```

File Edit View Tools Window Help

Courier New   10

US-PAT-NO: 5488664

DOCUMENT-IDENTIFIER: US 5488664 A

TITLE: Method and apparatus for protecting visual in:
                        with printed cryptographic watermarks

---------- KWIC ---------

US Patent No. - PN (1):
    5488664

Brief Summary Text - BSTX (10):
    The purpose of the invention is to produce a printed watermark whi
provides reasonable security against unauthorized access to and modi:
visual information at very low costs. The cryptographic printed wate
the invention can be produced by standard laser or ink-jet printers a
verified directly by the human visual system without using any crypto
knowledge, computational devices or chemical processes. The watermar
of an array of printed shapes which appears to be random, and the dev
consists of another array of printed shapes, which also appears to be
printed on a transparent medium. When the transparent developer is
the printed watermark, a hidden image becomes clearly visible.

Detailed Description Text - DETX (2):
    With reference to the drawings which illustrate a typical watermar
developer and various pixels and subpixels, FIG. 1a illustrates an a:
subpixels forming a typical printed watermark and FIG. 1b illustrates
of subpixels forming a typical printed developer. The hidden image :
completely invisible in each of the two arrays. If FIG. 1b is photoc
a transparency 2 and then placed on top of and aligned with sheet 4 f
watermark printed thereon, FIG. 1a, as shown in FIG. 1c, a viewer loc
through FIG. 1b of the transparency, illustrating the developer, onto
of the watermark, sees the hidden image of a circle 6, which is the v
encoded in the apparently random array of shapes that makes up FIGS.
The subpixels of the arrays of FIGS. 1a and 1b are rectangles each p:
of two black subpixels and two white subpixels.

Detailed Description Text - DETX (8):
    Another embodiment of the invention allows images to be concealed,
example, a first sheet of material may be printed with an image of, i
example, a house. A second transparent sheet of material may be prir
an image of, for example, a dog. The developer (transparency) image
may be superimposed on the watermark image of the house and a hidden
then be seen with no trace of either the house or the dog being visil
construct such a scheme, a more complex collection of 2.times.2 subar
subpixels is used, as shown in FIGS. 4a to 4l. In the individual ima
subarrays having two black subpixels are considered to be white and s
having three black subpixels are considered to be black. In the supe
image, subarrays having three black subpixels are considered to be wh

Details Text Image HTML   KWIC

United States Patent [19]

Shamir

[11] Patent Number: **5,488,664**

[45] Date of Patent: **Jan. 30, 1996**

[54] METHOD AND APPARATUS FOR
      PROTECTING VISUAL INFORMATION
      WITH PRINTED CRYPTOGRAPHIC
      WATERMARKS

[75] Inventor: Adi Shamir, Rehovot, Israel

[73] Assignee: Yeda Research and Development Co.
                 Ltd., Rehovot, Israel

[21] Appl. No.: 231,935

[22] Filed: Apr. 22, 1994

[51] Int. Cl.⁶ G09C 5/00
[52] U.S. Cl. 380/54; 380/3; 380/23;
                              380/55; 283/73; 283/113; 283/17
[58] Field of Search 380/3, 4, 23, 51,
                        380/54, 55, 59; 283/73, 113, 17, 90;

[56]   References Cited

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FOREIGN PATENT DOCUMENTS

0265815	2/1614	European Pat. Off.	G09C 5/00

[57]   ABSTRACT

A method and device for protecting visual information against unauthorized access and modification using a printed cryptographic watermark includes printing a first array of shapes on a first sheet of material to be protected and printing a second array of shapes on a second sheet of material, which is transparent so as to form a developer for developing a watermark encoded in a combination of the first and second arrays of shapes. The watermark is encoded by preparing each array using black and white pixels. Each pixel, which may be a square, rectangle, circle, hexagon or other shape, is split into first and second collections of subpixels, the first collection of subpixels appearing in the first array of shapes and the second collection of subpixels appearing in the second array of shapes. When the transparent second sheet of material is positioned directly on top of the first sheet of material with the second array of shapes aligned with the first array of shapes, the first sheet of material may be viewed through the transparent second sheet of material. In this manner, the encoded watermark, which was not visible in either one the two individually, becomes visible. Additionally, a first image may be encoded in the first sheet, a second image may be encoded in the second sheet, and the watermark may be viewed as a third image that is visible in the combination of the first and second sheets.

18 Claims, 4 Drawing Sheets

Details Text Image HTML   Full

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Courier New 10

PAT-NO: 6647130

UMENT-IDENTIFIER: US 6647130 B2

LE: Printable interfaces and digital linking with emb
                   codes

------ KWIC ---------

tract Text - ABTX (1):
A physical medium is encoded with machine readable information that pr
uman interface to a computer system. The information encoded into the
ium indicates a computer implemented process, and is encoded according
ctral encoding scheme, such as encoding by modifying color values of a
phic or other image printed on the medium. For example, a digital wat
other steganographic data hidden in the image indicates a web page. T
ponse to the user selecting the encoded information area, the machine
dable information is decoded, and used to invoke a computer implemente
cess.

iled Description Text - DETX (271):
A major improvement to the nominal knot pattern system previously desc
ectly addresses practical difficulties (1), the inefficient covering,
unwanted visibility of the rings, and (6) the need for higher levels
urity. This improvement also indirectly address item (4) the overlap
ue, which has been discussed in the last paragraph. This major improv
the following: just prior to the step where the mosaic of the encoded
terns is added to an original image to produce a distributable image,
aic of encoded knot patterns, 866, is spatially filtered (using common
techniques) by a standardized and (generally smoothly) random phase-c
tial filter. it is very important to note that this phase-only filte
elf fully rotationally symmetric within the spatial frequency domain,
filtering effects are fully rotationally symmetric. The effect of t
se-only filter on an individual luminous ring is to transform it into
othly varying pattern of concentric rings, not totally dissimilar to
tern on water several instances after a pebble is dropped in, only th
e patterns are somewhat random in the case of this phase-only filter
n the uniform periodicity of a peddble wave pattern. FIG. 20 attempts
e a rough (i.e. non-greyscale) depiction of these phase-only filtered
terns. The top figure of FIG. 20 is a cross section of a typical bri
tour/profile 874 of one of these phase-only filtered ring patterns.
erenced in the figure is the nominal location of the pre-filtered out
ter, 870. The center of an individual ring, 872, is referenced as the
und which the brightness profile is rotated in order to fully describe
dimensional brightness distribution of one of these filtered pattern
ther rough attempt to communicate the characteristics of the filtered
depicted as 876, a crude greyscale image of the filtered ring. This
se-only filtered ring, 876 will can be referred to as a random ripple
tern.

Details Text Image HTML   KWIC

US006647130B2

(12) **United States Patent**   (10) Patent No.:   **US 6,647,130 B2**
     Rhoads   (45) Date of Patent: Nov. 11, 2003

(54) PRINTABLE INTERFACES AND DIGITAL
     LINKING WITH EMBEDDED CODES

(75) Inventor: Geoffrey B. Rhoads, West Linn, OR
                (US)

(73) Assignee: Digimarc Corporation, Tualatin, OR
                (US)

(*) Notice: Subject to any disclaimer, the term of this
             patent is extended or adjusted under 35
             U.S.C. 154(b) by 0 days.

(21) Appl. No.: 10/189,187

(22) Filed: Jul. 3, 2002

(65)   Prior Publication Data
     US 2003/0031541 A1 Feb. 13, 2003

             Related U.S. Application Data

(63) Continuation of application No. 09/612,177, filed on Jul. 6, 2000, which is a continuation of application No. 08/746,613, filed on Nov. 12, 1996, now Pat. No. 6,122,403, which is a continuation-in-part of application No. 08/649,419, filed on May 16, 1996, now Pat No. 5,862,260, and a continuation-in-part of application No. 08/508,083, filed on Jul 27, 1995, now Pat. No. 5,841,978, which is a continuation-in-part of application No. 08/436,798, filed on May 8, 1995, now Pat. No. 5,636,292, and a continuation-in-part of application No. 08/327,426, filed on Oct. 21, 1994, now Pat. No. 5,796,426, and a continuation-in-part of application No. 08/215,289, filed on Mar. 17, 1994, now abandoned, said application No. 08/337,426, filed on Oct. 21, 1994, is a continuation-in-part of application No. 08/215,289, filed on Mar. 17, 1994, now abandoned, which is a continuation-in-part of application No. 08/154,866, filed on Nov. 18, 1993, now abandoned.

(51) Int. Cl.7 .... H04K 1/00

(52) U.S. Cl. 382/180

(56)   Field of Search 382/100, 112,
                382/232, 284; 359/3, 28, 448, 450; 380/54,
                231-234, 287; 283/72, 73, 93, 94, 113,
                901; 345/475.1; 235/494, 340/5.93, 5.6,
                5.65, 5.8, 5.81, 5.83; 356/71; 902/1, 4,
                6; 713/176; 385/94; 705/1, 44; 345/760,
                763, 764, 617, 836; 707/10, 104.1, 501.1,
                513; 709/200, 217-219, 227, 236, 245,
                250, 328, 329

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     EP   0 493 091 A1 * 1/1992 .... H04N 1/387
                (List continued on next page.)
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     U.S. patent application Ser. No. 60/000,442, Hudetz, filed Jun. 1995.
                (List continued on next page.)

Primary Examiner—Jose L. Couso
(74) Attorney, Agent, or Firm—Joel R. Meyer; Digimarc
Corporation

(57)   **ABSTRACT**

A physical medium is encoded with machine readable information that provides a human interface to a computer system. The information encoded into the medium indicates a computer implemented process, and is encoded according to a spectral encoding scheme, such as encoding by modifying color values of a graphic or other image printed on the medium. For example, a digital watermark or other steganographic data hidden in the image indicates a web page. In response to the user selecting the encoded information area, the machine readable information is decoded, and used to invoke a computer implemented process.

19 Claims, 31 Drawing Sheets
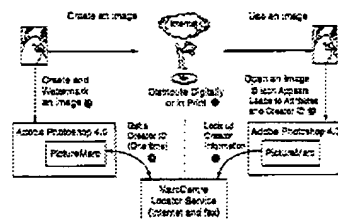
Details Text Image HTML   Full

5768,426   572336

DERWENT-ACC-NO: 2002-391420

DERWENT-WEEK: 200417

COPYRIGHT 1999 DERWENT INFORMATION LTD

TITLE: A method to embed and extract hidden digital w
                         to protect the copyright of the original image
                         embedding the watermarked image to the origina
                         through clockwise and counterclockwise DCT
                         transformations

INVENTOR: SHIU, C; WU, J ; HSU, C

PATENT-ASSIGNEE: CYBERLINK CORP[CYBEN]

PRIORITY-DATA: 1999TW-0112076 (July 16, 1999)

PATENT-FAMILY:
PUB-NO   PUB-DATE   LANGUAGE   P/
US 6700991 B1   March 2, 2004   N/A   06
TW 451171 A   August 21, 2001   N/A   06

APPLICATION-DATA:
PUB-NO   APPL-DESCRIPTOR   APPL-NO   /
US 6700991B1   N/A   2000US-0520058 N
TW 451171A   N/A   1999TW-0112076 0

INT-CL (IPC): G06K009/00, G06K009/46 , G09C005/00

ABSTRACTED-PUB-NO: TW 451171A

BASIC-ABSTRACT:

NOVELTY - This invention discloses a method to embed hidden digital w
The method includes the following: an original image and a watermarke
are provided. A scattered watermarked image is produced by randomly
the watermarked image. Then, the original image and the scattered wa
image are sorted on the base of section to generate multiple origina
sections and the watermarked sections corresponding to the original
sections through a determined sorting approach. The original image s
are DCT transformed clockwise to convert the sections to DCT coeffic:
sections corresponding to different frequency ranges. The watermarke
are embedded to the DCT coefficient sections of the original image se
within the determined frequency range to generate multiple combined D
coefficient sections. Then, the combined DCT coefficient sections ar
transformed counterclockwise to produce an image with embedded waterm
protect the copyright of the original image.

CHOSEN-DRAWING: Dwg.1/1

TITLE-TERMS: METHOD EMBED EXTRACT HIDE DIGITAL WATERMARK PROTECT ORIC
             EMBED WATERMARK IMAGE ORIGINAL IMAGE THROUGH CLOCKWISE DC
             TRANSFORM

Details Text Image HTML   FULL

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Walton, "Image Authentication for a Slippery New Age", pp. 18, 19, 20, 22, 24, 26, 82, 84-87, Dr. Dobb's Journal, Apr. 1995.

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Primary Examiner—Leo Boudreau
Assistant Examiner—Hussein Akhavannia
(74) Attorney, Agent, or Firm—Fish & Richardson P.C.

(57)   ABSTRACT

An image authentication method by embedding digital watermarks into images, comprising: providing an original image and a watermark image, applying pseudo-random permutations to the watermark image for generating a dispersed watermark image; applying block-based permutations to the original image and the dispersed watermark image in order to form a plurality of original image blocks with each of the watermark blocks dispersed over the corresponding image block only; applying FDCT (Forward Discrete Cosine Transform) on each of the original image blocks independently so that each of the original image blocks is transformed into a DCT coefficient block that corresponds to different frequency ranges; embedding said watermark image blocks into said DCT coefficient blocks, in order to form a plurality of combined DCT coefficient blocks; applying IDCT (Inverse Discrete Cosine Transform) to the combined DCT coefficient blocks to form an embedded watermark image.
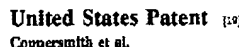
10 Claims, 9 Drawing Sheets

File Edit View Tools Window Help

Courier New 10

US-PAT-NO: 6069955

DOCUMENT-IDENTIFIER: US 6069955 A

TITLE: System for protection of goods against counter
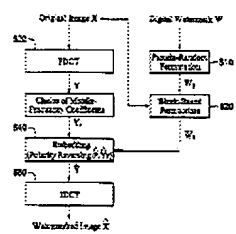
--------- KWIC ---------

Abstract Text - ABTX (1):
    A visible seal or label containing a serial number is placed in p
on the product packaging. The visible label contains the serial numl
as a first public key encrypted version of the serial number. A seco
hidden label inside of the package has thereon a second a second encr
version of the serial number made using a second public key. The hic
may be secured inside of the package out of sight or may be placed or
of the visible label and therefore viewable through a transparent cas
opened or visible when peeled off. The private keys are known only t
manufacturer. Using a corresponding public key provided by the manuf
the consumer, law enforcement agent, or customs inspector can verify
encrypted version matches the serial number. An advantage to this me
that only the manufacturer can produce matching pairs. Moreover, us:
of sale machine equipped with the public key the sales clerk can auth
the product in front of the consumer at point of purchase. Additiona
the case of a CD or other digital medium, the hidden label may compr
digital watermark of the encrypted serial number such that a consumer
enforcement agency, or customs inspector can readily detect a counter
product.

US Patent No. - PN (1):
    6069955

Details Text Image HTML   KWIC
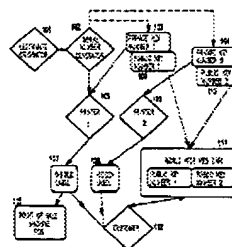
L Number	Hits	Search Text	DB	Time stamp
1	3	(("5488664") or ("6700991") or ("6069955")).PN.	USPAT	2004/08/19 20:59
2	11	("5208857" | "5323187" | "5809139" | "5864649" | "5930369" | "6185312" | "6240121" | "6285775" | "6317767" | "6373974" | "6560370").PN.	USPAT	2004/08/19 20:59
3	3	6069955.URPN.	USPAT	2004/08/19 21:04
4	78	5488664.URPN.	USPAT	2004/08/19 21:20
5	45	5734752.URPN.	USPAT	2004/08/19 21:17
6	1	("5488664").PN.	USPAT	2004/08/19 21:20

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